

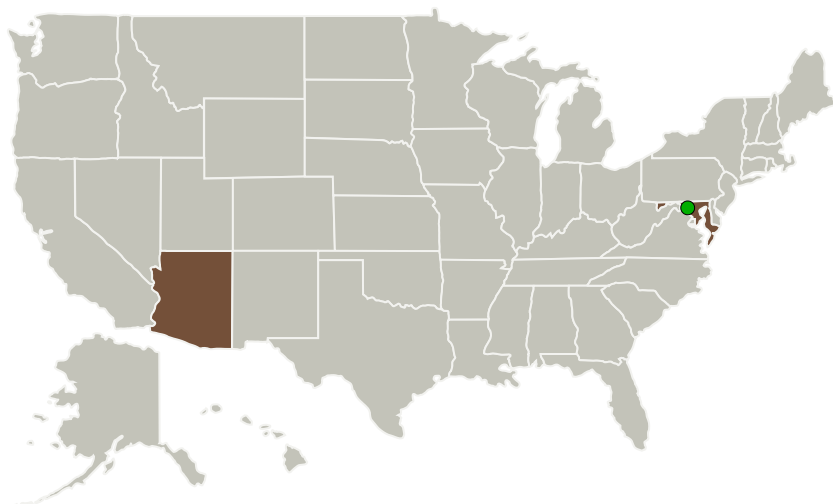
High SBS-Threshold Er/Yb Co-Doped Phosphate Glass Fiber Amplifiers for High Power, Sub-us Pulsed, Narrow Linewidth, All Fiber-Based Laser Transmitter, Phase II

Completed Technology Project (2010 - 2012)

Project Introduction

In Phase I, NP Photonics has achieved 1.2 kW peak power for 105 ns fiber laser pulses, and successfully demonstrated the feasibility to produce monolithic high SBS threshold narrow linewidth fiber amplifiers for all fiber-based laser transmitters ideally suited to NASA's active remote sensing spectroscopy. In Phase II, NP Photonics proposes to develop prototypes or products of the high SBS-threshold, Single-Mode (SM), polarization maintaining (PM), high power amplifiers operating with sub-microsecond pulses and transform-limited linewidth. This is based on the successful demonstrations in Phase I by using NP's proprietary patented large core SM PM highly Er/Yb co-doped phosphate glass fibers. Furthermore, in order to push the SBS threshold to the 100s kW level and to demonstrate even higher SBS threshold and improved conversion efficiency for 100-500 ns transform-limited fiber laser pulses, a new large core SM PM photonic crystal phosphate fiber 100/400 will be designed and fabricated in Phase II. It will be used to build the 3rd power amplifier stage in order to offer prototype/product services by achieving 10s kW peak power and 5-mJ pulse energy free of SBS effects. This will more fully enable NASA's active remote sensing with fiber laser pulses at 765 nm by using NP's Single Mode phosphate fiber amplifiers.

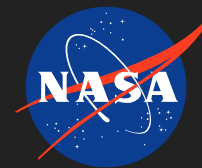
Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
NP Photonics, Inc.	Lead Organization	Industry	Tucson, Arizona
● Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Arizona	Maryland

Project Transitions

▶ **January 2010:** Project Start

✓ **January 2012:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/139065>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

NP Photonics, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

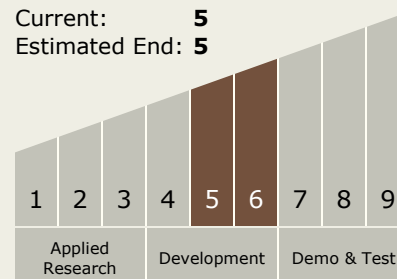
Carlos Torrez

Principal Investigator:

Wei Shi

Technology Maturity (TRL)

Start: 6
Current: 5
Estimated End: 5



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Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.5 Lasers

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System